

CLAIMS

What is claimed is:

1. An imaging system, comprising:
a sensor comprising pixels, the pixels having a pixel area of about 0.01 microns² or more and about 600 microns² or less; and
an image transfer medium having a diffraction limited spot size area in the object plane of about 0.0003 microns² or more and about 600 microns² or less,
wherein pixels projected through the image transfer medium have a projected pixel area in the object plane of about 0.0003 microns² or more and about 600 microns² or less, the ratio of the projected pixel area in the object plane to the diffraction limited spot size area in the object plane is from about 5:1 to about 1:12.
2. The imaging system of claim 1, wherein the projected pixel area is about 0.001 microns² or more and about 200 microns² or less, the diffraction limited spot size area is about 0.001 microns² or more and about 200 microns² or less, and the ratio of the projected pixel area to the diffraction limited spot size area is from about 3.5:1 to about 1:8.
3. The imaging system of claim 1, wherein the projected pixel area is about 0.01 microns² or more and about 100 microns² or less, the diffraction limited spot size area is about 0.01 microns² or more and about 100 microns² or less, and the ratio of the projected pixel area to the diffraction limited spot size area is from about 3:1 to about 1:6.
4. The imaging system of claim 1, wherein the sensor comprises pixels having substantially the same pixel area and substantially the same shape.
5. The imaging system of claim 1, wherein the sensor comprises a first subset of pixels having a first pixel area and a second a subset of pixels having a second pixel area, the first pixel area different from the second pixel area.

6. The imaging system of claim 1, wherein the image transfer medium comprises at least two lenses.

7. The imaging system of claim 1, wherein the sensor comprises a plurality of stacked pixels, where each pixel in a stack has substantially the same size.

8. The imaging system of claim 7, wherein each stack of pixels comprises two, three or four pixels.

9. An imaging system, comprising:
a sensor comprising pixels, the pixels having a pixel pitch of about 0.1 microns or more and about 20 microns or less; and
an image transfer medium having a diffraction limited spot in an object plane having a diameter of about 0.01 microns or more and about 20 microns or less,
wherein pixels projected through the image transfer medium have a projected pixel diameter in the object plane of about 0.01 microns or more and about 20 microns or less, the ratio of the projected pixel pitch in the object plane to the diffraction limited spot diameter in the object plane is from about 1:1.9 to about 1.9:1.

10. The imaging system of claim 9, wherein the projected pixel pitch is about 0.05 microns or more and about 15 microns or less, the diffraction limited spot diameter is about 0.05 microns or more and about 15 microns or less, the ratio of the projected pixel pitch to the diffraction limited spot diameter is from about 1:1.5 to about 1.5:1.

11. The imaging system of claim 9, wherein the projected pixel pitch is about 0.1 microns or more and about 10 microns or less, the diffraction limited spot diameter is about 0.1 microns or more and about 10 microns or less, the ratio of the projected pixel pitch to the diffraction limited spot diameter is from about 1:1.3 to about 1.3:1.

12. The imaging system of claim 9, wherein the image transfer medium comprises an objective lens system and a transfer lens system.

13. The imaging system of claim 9, wherein the objective lens system comprises a single objective lens or a plurality of lenses.

14. The imaging system of claim 9, wherein the sensor comprises a plurality of stacked pixels, each pixel in a stack has substantially the same size, and each pixel in a stack captures a different range of wavelengths of light.

15. The imaging system of claim 9, wherein the image transfer medium having a diffraction limited spot in an image plane having a diameter of about 0.1 microns or more and about 20 microns or less, wherein the ratio of the pixel pitch to the diffraction limited spot in the image plane is from about 1:1.25 to about 1.25:1.

16. An imaging system, comprising:
a sensor comprising pixels, the pixels having a pixel width of about 0.1 microns or more and about 20 microns or less; and
an image transfer medium having a diffraction limited spot in an object plane having a diameter of about 0.01 microns or more and about 20 microns or less,
wherein pixels projected through the image transfer medium have a projected pixel width in the object plane of about 0.01 microns or more and about 20 microns or less, the ratio of the projected pixel width in the object plane to the diffraction limited spot diameter in the object plane is from about 1:1.9 to about 1.9:1.

17. The imaging system of claim 16, wherein the pixels have at least one of a rectangular shape and a square shape.

18. The imaging system of claim 16, wherein the projected pixel width is about 0.05 microns or more and about 15 microns or less, the diffraction limited spot diameter is about 0.05 microns or more and about 15 microns or less, the ratio of the projected pixel width to the diffraction limited spot diameter is from about 1:1.7 to about 1.7:1.

19. The imaging system of claim 16, wherein the projected pixel width is about 0.1 microns or more and about 10 microns or less, the diffraction limited spot diameter is about 0.1 microns or more and about 10 microns or less, the ratio of the projected pixel width to the diffraction limited spot diameter is from about 1:1.2 to about 1.2:1.

20. The imaging system of claim 16 further comprising an illumination source providing at least about 75% of illumination energy having a wavelength range from about 100 nm to about 2,000 nm.